What is claimed is:

1. A method for embedding a digital watermark on a wavelet lowest subband, the method comprising:

setting a DC component region of a multi-stage wavelet-transformed original copy image to a watermark embedment region, and high-frequency filtering an original picture LL_n of the embedment region to generate a mirror picture LL_n' from which a high frequency component is eliminated;

generating index information for designating a pixel position on which the watermark is embedded within the watermark embedment region, and a watermark sequence to be embedded;

calculating an embedment strength λ for each position of the watermark embedment region considering a variance degree of an original picture LL_n coefficient value;

in case the watermark sequence is sequentially embedded on an embedded position designated by the index information, mutually comparing the original picture LL_n coefficient value for each embedded position with a mirror picture LL_n' coefficient value, and then altering the original picture LL_n coefficient value depending on the watermark value with reference to the embedment strength λ of a corresponding position to embed the watermark; and

in case the original picture LL_n coefficient value altered by watermark embedment is differentiated above a predetermined value with reference to the corresponding embedment strength λ in comparison with the coefficient value before altered, skipping the watermark embedment for the position.

2. The method of claim 1, wherein in the high frequency component eliminating step, the high-frequency component is eliminated from a picture of the watermark embedment region through Wiener filtering.

3. The method of claim 1, wherein in the embedment strength calculating step, the embedment strength λ every position is calculated for the watermark embedment region according to the following Equations (1) and (2).

$$NVF(i,j) = \frac{\sigma^2{}_{\max}}{\sigma^2{}_{\max} + \theta\sigma^2(i,j)} \quad \cdots\cdots\cdots (1)$$

$$\lambda(i,j) = S_e \bullet (1 - NVF(i,j)) + S_f \bullet NVF(i,j) \quad \cdots\cdots\cdots (2)$$

$\sigma^2(i,j)$: a local variance value for a peripheral region centering on the position (i,j).

σ^2_{max} : a maximum local variance value in the watermark embedment region.

S_e, S_f and Θ : embedment strength controlling values.

4. The method of claim 1, wherein in the watermark embedding step, in case the watermark '1' is embedded in a corresponding embedded position, the original picture coefficient value $LL_n(i)$ is compared with a value $LL_n'(i)+\lambda(i)$ obtained by adding the embedment strength to the mirror picture coefficient value such that if the original picture coefficient value is more than the added value, the original picture coefficient value is maintained as it is, and if the original picture coefficient value is less than the added value, the original picture coefficient value of the position is substituted for the added value.

5. The method of claim 1, wherein in the watermark embedding step, in case the watermark '-1' is embedded in a corresponding embedded position, the original picture coefficient value $LL_n(i)$ is compared with a value $LL_n'(i)-\lambda(i)$ obtained by subtracting the embedment strength from the mirror picture coefficient value such that if the original picture coefficient value is less than the added value, the original picture coefficient value is maintained as it is, and if the original

picture coefficient value is more than the added value, the original picture coefficient value is substituted for the added value for alteration.

6. The method of claim 1, wherein in the watermark embedding-skipping step, in case the original picture coefficient value altered by the watermark embedment is differentiated from an initial original picture coefficient value before the watermark embedment at more than three times the embedment strength, the initial original picture efficient value is maintained to skip the watermark embedment.

7. The method of claim 1, wherein in the watermark embedding step, the watermark sequence is repetitively embedded in each embedded position at predetermined times being set depending on robustness and screen degradation degree.

8. A method for embedding a digital watermark on a wavelet lowest subband, the method comprising:

wavelet-transforming a watermark embedded image into the same level as that of the time of watermark embedment and then defining a DC component region as a watermark extracted region, and performing a high-frequency filtering for an original picture

LL_{nE} of the extracted region to generate a mirror picture LL_{nE}' from which a high frequency component is eliminated;

mutually comparing an original picture coefficient value with a mirror picture coefficient value at each extracted position depending on index information for designating a watermark extracted position to extract a watermark sequence $W_E(i)$;

receiving a key value from a user to generate a watermark sequence W(i) of the time of watermark embedment; and

determining a similarity between the extracted watermark sequence and the watermark sequence of the time of embedment, and determining whether or not the watermark exists depending on whether or not the similarity is more than a predetermined critical value.

9. The method of claim 8, wherein in the watermark extracting step, in case the original picture coefficient value is less than the mirror picture coefficient value, a watermark value '-1' is extracted from each extracted position, and in the contrary case, a watermark value '+1' is extracted.